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DEPT. OF TRANSPORTATION
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Dockets Management System
US Department of Transportation, PL 401
400 Seventh Street, SW
Washington, D.C. 20590-0001

Date: June 21, 2000

Re: Docket Number RSPA-99-6283 -((
HM-230

Gentlemen:

This letter is in response to DOT's proposed rulemaking to amend its Hazardous Materials Regulations pertaining to the transportation of radioactive materials to conform to the recommended provisions published in the International Atomic Energy Agency document referred to as "ST-1". Our comments herein are in addition to and not a replacement of those submitted to you in our previous letter dated 05 April 2000.

Item 1: Reduction of the A_1 quantity for californium-252 from its present value of 0.1 TBq (2.7 Ci) to 0.05 TBq (1.35 Ci).

The IAEA's reason for the recommended reduction is not given in ST-1. It is given only in Appendix 1 of IAEA ST-2, which has not been published and is not readily available to the public, although a draft version of ST-2 without the appendices is available at the DOT's internet site.

The A_1 quantity, as stated in ST-2, Appendix 1, is that quantity of special form material which would result in an unshielded radiation exposure rate of 0.1 Sv/hr (10 Rem/hr) at a distance of one meter. The specific reason for the recommended reduction in the A_1 value for Cf-252 is stated in paragraph A.I.3 of that appendix as resulting from an "increase of a factor of 2 in the radiation weighting factor for neutrons recommended by ICRP" in ICRP Publication 60. Thus, the reduction in A_1 for Cf-252 results solely from a recommendation in ICRP 60, published in 1985. ICRP 60 itself (as reported on page 543 of The Health Physics and Radiological Health Handbook, Revised Edition, 1992) states that the recommendation to change the weighting factors (also called Q values) for fast neutrons from 10 to 20 is an interim recommendation while further study is undertaken over "the next four years or so".

The results of that "further study" do not appear to have been published, nor has the recommendation to increase the Q value for fast neutrons to 20 been generally accepted. The use of the ICRP 60 value of 20 for setting the A_1 value of Cf-252 is inconsistent with the Q values accepted by the following (and most other) organizations:

- (1) U.S. Department of Transportation. See 49CFR, section 173.403.
- (2) U.S. Nuclear Regulatory Commission. See 10CFR, Part 20, paragraphs 20.2401 (b) and 20.2401 (c).
- (3) U.S. Department of Energy. See DOE Order 5480.11, Change 3 (6/17/92), section 9, Figure 3, "Quality Factors for Neutrons".
- (4) International Standards Organization (ISO). See International Standard, ISO 8529:1989(E), "Neutron Reference Radiations For Calibrating Neutron-Measuring Devices Used For Radiation Protection Purposes and For Determining Their Response As A Function Of Neutron Energy", esp. Annex B.

The references above report neutron flux to dose factors and/or Q values in a variety of different units and forms. The values in all references are equivalent to each other and are consistent with maximum Q values of 10 or 11, not the twenty recommended by ICRP 60. None of the referenced organizations is known to be considering the adoption of the ICRP 60 neutron Q value recommendations, nor is there reason for them to do so. Discussions with colleagues at several national laboratories and institutions, universities, and private organizations indicates that there is no clear evidence or consensus supporting the ICRP 60 values.

Acceptance of the ST-1 A₁ value of 0.05 TBq for Cf-252 by the United States by incorporation of it into DOT Regulations implies acceptance of the doubled neutron dose weighting factors upon which that value is based. This would have implications far beyond the amount of Cf-252 which may be shipped in a Type A package. These include:

- (1) The capacities of ALL packages for shipment of neutron-emitters would be halved, because the capacities are limited by dose outside the package, and the neutron "dose" would double. This would double the costs of neutron-source shipments. Larger packages would have to be fabricated, adding more costs. Total number of shipments would increase.
- (2) All existing neutron dose-measuring equipment in the U.S. would have to be replaced, modified, or at least recalibrated to indicate twice what is now indicated in any given neutron field.
- (3) Allowable exposures to individuals by neutron fields would be halved.
- (4) Persons previously exposed to neutrons would find their doses had been under-reported by 100 percent. Persons who received more than half of the regulatory dose limit in any period based on current Q values would be found to have received exposures above regulatory limits.
- (5) All regulations incorporating the present Q values would need revision.

Item 2: Requirement for all rail or road vehicles carrying W-I, Y-II or Y-III packages to be placarded "Radioactive".

Placarding of vehicles carrying hazardous materials is done, at least in part, to inform responders to an accident of the presence of specific classes of material without their having to closely approach or enter the vehicle. Consider a truck carrying a Radioactive White-I package of dimensions 8" x 8" x 8", plus five fifty-five gallon drums of

acetone and which is placarded for both. A responder to an accident seeing the Radioactive placard might expose himself to a significant and immediate risk associated with acetone in order to locate and secure a W-I package which poses no immediate risk and has little potential for long-term risk. Consider another truck carrying a Yellow-II package plus a package of poison gas; the truck is placarded "Dangerous". Here, the presence of the Y-II package which poses no immediate danger results in the loss of important information to the responder, i.e., that the truck contains a shipment of poison gas. All the responder is aware of is that the truck contains two or more "hazardous" items, but not what type they are, and this increases his risk.

We believe that any benefit derived from placarding vehicles carrying Radioactive White-I and Yellow-II packages is outweighed by the potential of increased risk to accident responders.

We respectfully recommend and request:

1. That DOT retain the present A_1 value of 0.1 TBq for Cf-252 in future revisions of its regulations,
2. That DOT seek the reinstatement of 0.1 TBq as the A_1 value for Cf-252 in IAEA ST-1, which is currently undergoing revision,
3. That DOT seek amendment, prior to its acceptance by the U.S., of the draft IAEA ST-2 as necessary to support an A_1 value of 0.1 TBq for Cf-252, and to eliminate inconsistencies by removing from ST-2 the implied acceptance of the increased neutron radiation weighting factors recommended in ICRP Publication 60 and
4. That DOT not incorporate into its future regulations requirements for placarding vehicles carrying Radioactive White-I or Yellow-II labeled packages.

Sincerely,



Edward F. Janzow, Ph. D.
President